

## The Knowledge Bank at The Ohio State University

### Ohio State Engineer

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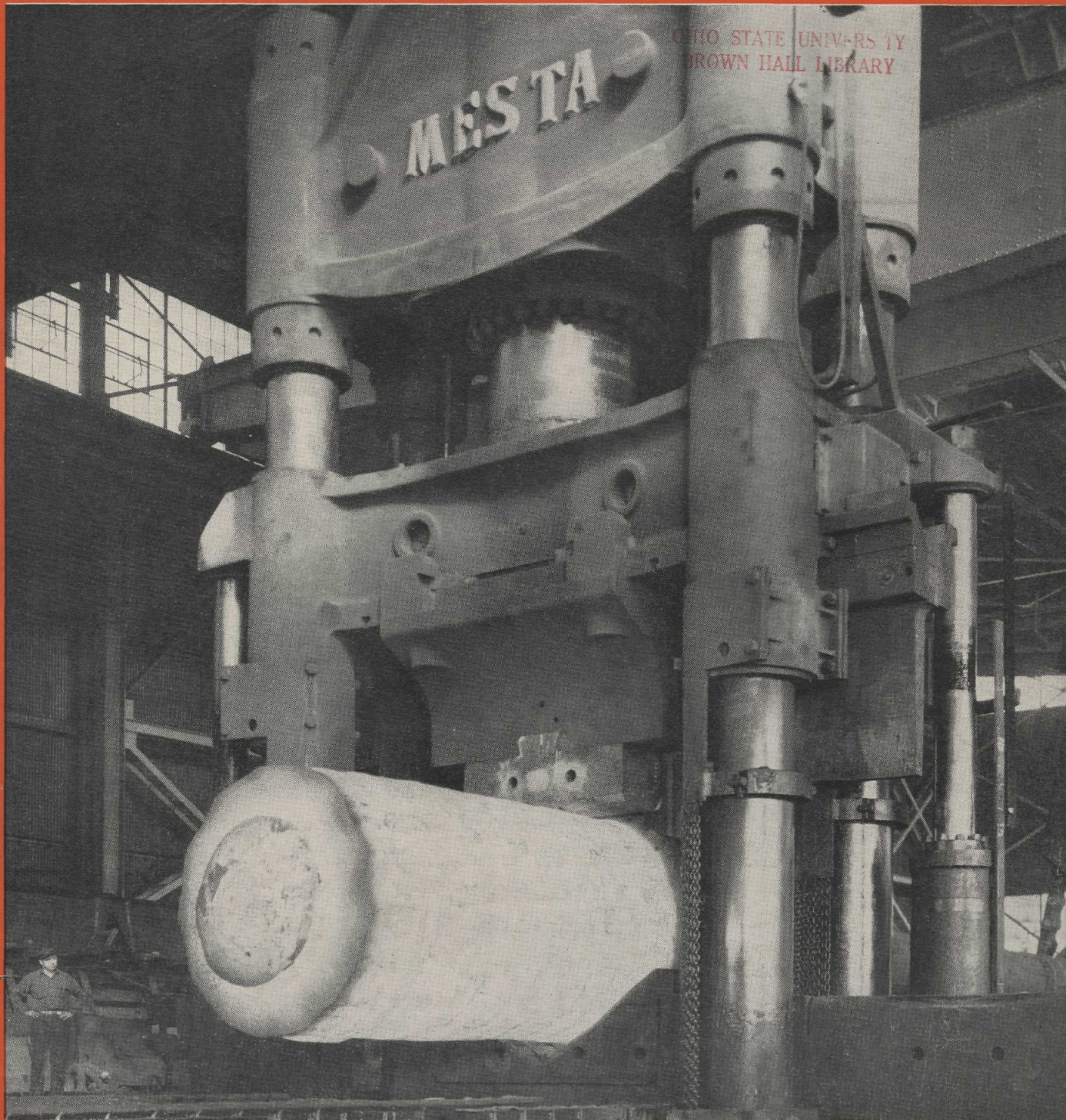
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# OHIO STATE ENGINEER

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1944

Price 15 Cents

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## A Valuable Post-War Asset for Every Student Engineer . . .

Until Victory has been won, all the Timken Tapered Roller Bearings we can make will continue to go into war equipment of all kinds and into the many different types of machines that help to make them.

When the war is over however, Timken Bearings again will be requisitioned for peace-time requirements of transportation and industrial equipment. Then the knowledge you acquire now will enable you to meet any and every bearing condition you may encounter in the future; for Timken Bearings have everything it takes to do a

complete bearing job—ability to eliminate friction; to carry radial, thrust and combined loads; and to hold moving parts in correct and constant alignment.

Learn to know your bearings now; this knowledge will pay dividends after Victory, no matter what kind of mechanical equipment you may be designing. The Timken Roller Bearing Company, Canton 6, Ohio.

**TIMKEN**  
TRADE-MARK REG. U. S. PAT. OFF.  
**TAPERED ROLLER BEARINGS**



## KEEPING UP WITH *Electricity*

**LANDING ON A DOT** is commonplace for our warplane pilots today, thanks to new blind-flying instruments made by Westinghouse. There are two pointers in the instrument—one to give pilot his *direction*—the other, his proper *gliding angle*. By manipulating flying controls to keep both pointers crossed over a dot on the dial, pilot can locate field and land blind in fog or darkness.

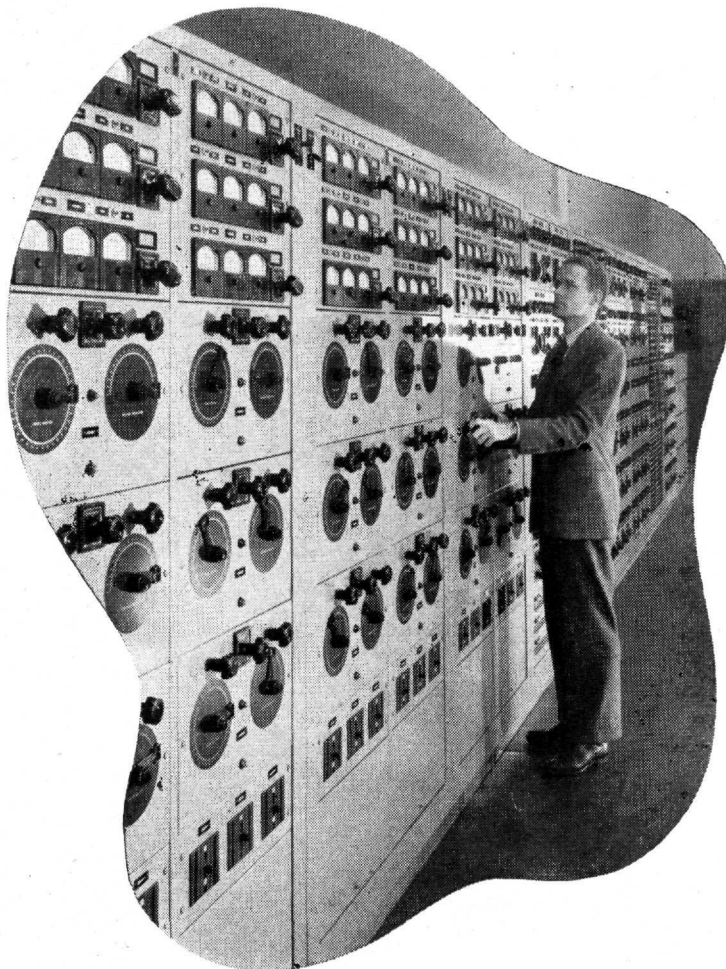
**ALL THE KING'S HORSES**—990,000 of them—would be needed to equal the power generated by six giant Westinghouse water-wheel generators at Grand Coulee Dam—largest of their kind ever built.

**ZIP . . .** A certain type of gyro fly-wheel must snap up to full speed (12,000 rpm) in just *1/5th of a second*. Westinghouse engineers devised a 10½ pound midget 22 horsepower electric motor to do the job. Secret of fast starting lies in special brushes that carry 600 amperes to the armature—at a density of *1600 amperes per square inch of brush area*.

**YO! HO!** A 50-foot mast performing sea service many miles from salt water, rolls more wildly than any crow's nest in a storm. The mast top travels 30 miles an hour, in swinging back and forth through a 90° arc every six seconds. Westinghouse developed this land-going mast to test sensitive ship-board electronic devices under conditions more severe than they will face at sea.

**SAVED—800 MAN-HOURS PER SHIP.** By changing the design of Victory ship gear cases, Westinghouse engineers saved 1/5 of a mile of arc welding (about 800 man-hours) on each case. Bending some of the thick steel plates, to make right angles (formerly welded), made possible this important saving in production time.

The above items are condensed excerpts from articles in the **WESTINGHOUSE ENGINEER**, a bi-monthly engineering review. Regular subscription price—\$2.00 a year. *Special price to students—50¢.*



## Getting the right answers—*fast!*

Pictured above is a remarkable “electrical brain” that enables an engineer to solve—in a *single hour*—intricate calculations that would take him more than 100 hours by mathematics. And other calculations, impossible to compute by *any* other method, are easily solved.

It's the new Westinghouse Network Calculator. The first model was developed in 1929 by Westinghouse engineers to help them analyze the electrical characteristics of a huge power system—by creating a *synthetic replica* of the system to laboratory scale.

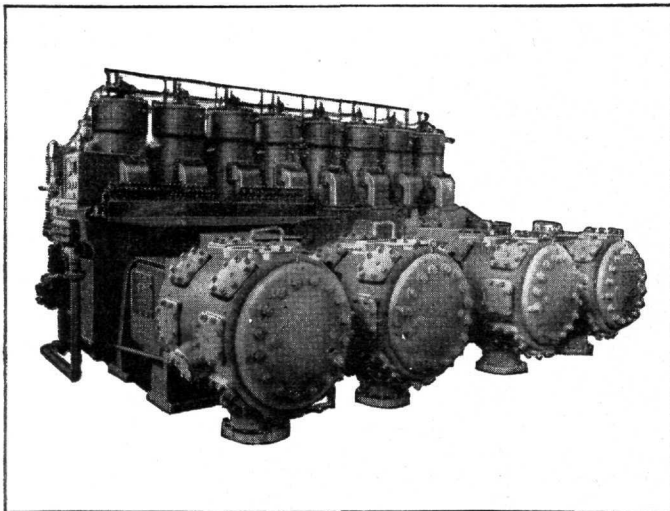
Now, even before a new electrical system is built, the calculator can reproduce in miniature the electrical characteristics of the proposed system—and can quickly calculate the changes in equipment needed for best results.

Today, this new and improved Westinghouse Network Calculator is available at our East Pittsburgh Works for making studies of public utility and industrial power systems. Another Westinghouse service to industry—giving the right electrical answers—fast. *Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pennsylvania.*

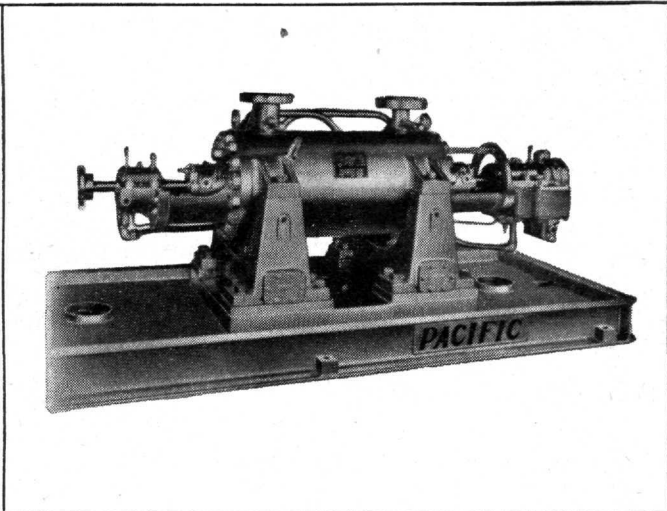
**WESTINGHOUSE PRESENTS John Charles Thomas, Sunday, 2:30 p.m., E.W.T., NBC.**  
“Top of the Evening,” Monday, Wednesday, Friday, 10:15 p.m., E.W.T., Blue Network.

# Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE



CLARK 8 Cyl. 800 B. H. P.  
GAS ENGINE DRIVEN COMPRESSOR



Pacific Type ITB—Hot Oil, Multi-Stage Horizontal, Forged  
Steel Shell, Double-Case, High Pressure Centrifugal Pump.

## Achievements in the Field

Half of Clark Bros. 64-year history has been largely devoted to developing and perfecting the "2 Cycle" Engine. Clark engineers, with far-sighted vision, recognized "2 Cycle" as the ultimate engine as long ago as 1910. Years of successful experiment and research produced the modern Clark "2 Cycle."

No greater tribute could be paid Clark for the hard pioneering years, than the wide acceptance Clark "2 Cycle" enjoys today, not only throughout the Petroleum Industry, but in many of the world's largest war industries such as Synthetic Rubber, Synthetic Ammonia and Toluene plants.

Illustrated above is the Clark 8 cylinder—800 B. H. P.—"2 Cycle" Gas Engine Driven Compressor. Because of its notable records in outstanding Recycling and Pressure Maintenance plant, petroleum engineers consider it "standard equipment."

**CLARK BROS. CO., INC.**  
Olean, N. Y.

Twenty years ago Pacific Engineers, in a modest little pump shop, startled the world with a radically new oil pumping technique. In those days oil pumps were costly and unreliable. They either ground themselves to uselessness in a few months or corrosion did the trick.

So these alert Pacific engineers took the micrometer, new alloys, finest of materials and developed new engineering methods. They created a group of precision pumps that defied all oil field and refinery pumping conditions—pumps of efficiency and economy with a life measured in years instead of months.

Today—in a large modern plant—Pacific still maintains its leadership with a complete line of centrifugal, turbine and plunger types of precision pumps for water well, oil well, refinery, pipeline, process, boiler feed and hot oil operations, as well as large emulsion pumps for synthetic rubber plants.

**PACIFIC PUMPWORKS**  
5715 Bickett St., Huntington Pk., Cal.

*"Two of the Dresser Industries"*



The promise of plastics, in the after-war years, holds so much for manufacturers and consumers alike that perhaps we should learn a little more about the nature of these new materials.

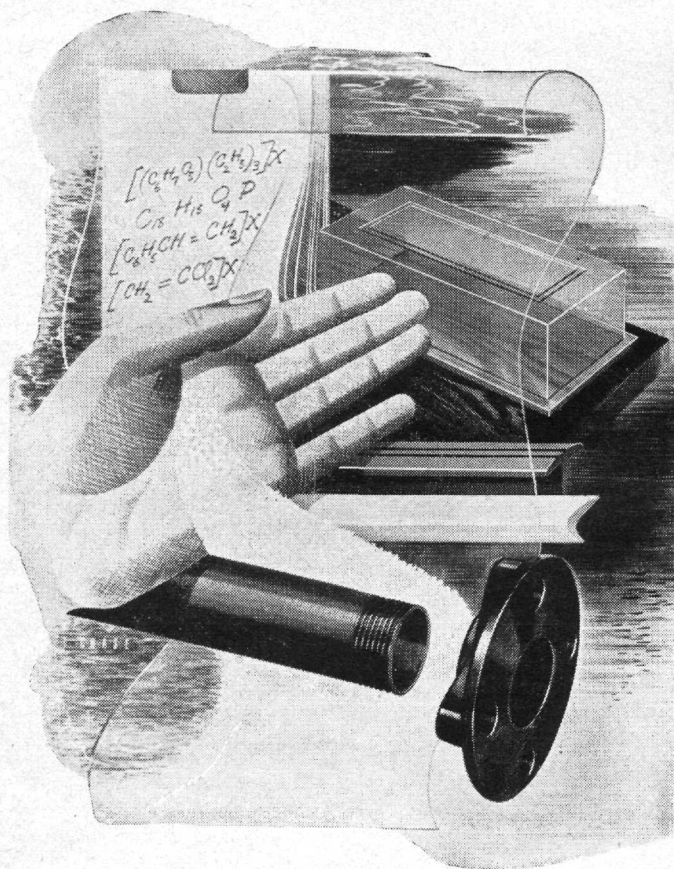
Of prime significance, chemically made plastics are unlike any structural material we have had to work with in the past.

Plastics are the product of chemistry. They are one of the outstanding examples of the chemist's ability to produce—out of coal, petroleum, air, salt, and other basic elements—totally new substances.

Important to an understanding of plastics is that they differ widely in their property characteristics.

For example, some plastics are extremely tough and withstand rough usage. This is true of Ethocel—one of the Dow plastics. Other types are pliable. Some have almost optical qualities in their clarity. Others possess excellent electrical insulating value. Some withstand heat and others extreme cold.

Among Dow plastics possessing some of these properties to a high degree is Styron—a plastic especially valuable as an electrical insulator and having many other uses where lustrous beauty or resistance to acids and alkalis are factors of importance. Saran, on the other hand, is notable for its tensile strength and flexibility, which make it widely used for such products as tubing, woven fabrics and rope. Ethocel, in a special formula, is especially strong and tough at extremely low temperatures.



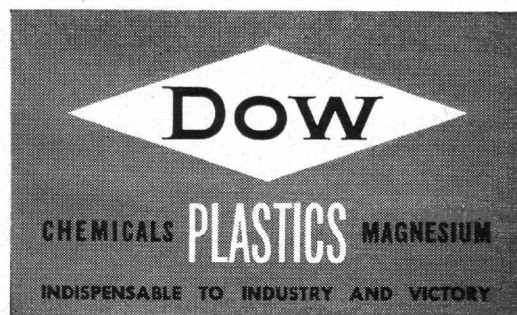
## JUST WHAT ARE "PLASTICS"?

The important point to remember is that the science of plastics is progressing rapidly. Already there exist many specialized plastics for specific applications. As our knowledge of both plastic compositions and the techniques for handling them increases, these new materials will undoubtedly become even more widely used than is now planned.

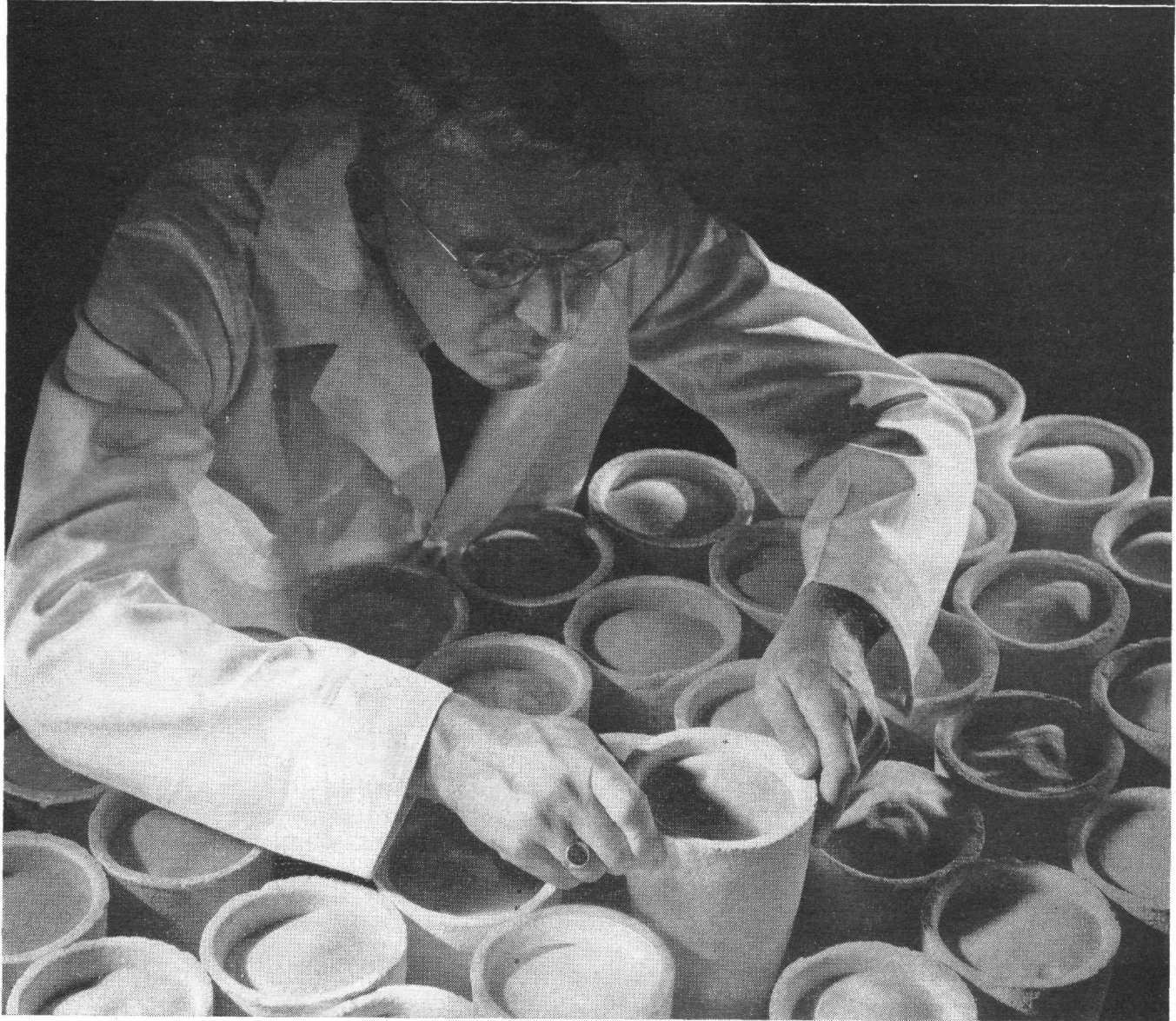
Dow Plastics include  
Styron, Saran, Saran Film, Ethocel  
and Ethocel Sheeting

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York Boston Philadelphia Washington Cleveland Detroit Chicago St. Louis  
Houston San Francisco Los Angeles Seattle



## Sand in Adolf's eye...



**T**HIS man is a glass chemist. And the sand he's working with is going to get into Adolf Hitler's eyes and hurt.

Here's how. Glass, basically is made from sand. And glass in this war, in the skilled hands of American glass makers, is a potent weapon. It replaces metals on many jobs, metals needed for killing Huns and Japs.

In bombsights and fire control instruments glass helps to rain accurate death on the enemy. In heavy industries, such as the explosive industry, its characteristic resistance to corrosion speeds powder output. Glass in medical and laboratory fields puts us and our allies ahead in hospital treatment and in vital laboratory developments.

The U.S. is lucky in having a well established glass industry and not having to lean

upon any part of the outside world for this essential material. Glass was ready for war, and was able to contribute to the speed records set by other industries such as gasoline and synthetic rubber.

It took a lot of research to make American glass the best in the world. At Corning way back in peacetime, more than 200 laboratory men were working steadily on new forms of glass and new uses for this amazing material. More than 25,000 formulae for glass were developed. Today around 250 different types of glass are in production under the "E" pennant at Corning's main plant.

There are glasses for example that withstand corrosive chemicals, that cannot be harmed by heat, that have

high electrical insulating qualities, that are extremely resistant to mechanical breakage. And these are only a few of the reasons that engineers, too, consider glass the material with endless possibilities for the future. Corning Glass Works, Corning, New York.

**CORNING**  
— means —  
**Research in Glass**

The Ohio State Engineer

# The OHIO STATE ENGINEER

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APRIL, 1944

No. 5

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